



SUBSTITUTE SHEETS FOR THE SEQUENCE LISTING

SEQUENCE LISTING

<110> E.I. duPont de Nemours and Company, Inc.

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Viitanen, Paul

Van Dyk, Drew E.

<120> High Level Production of P-Hydroxybenzoic Acid in Green Plants

<130> BC1015 US DIV

<140> US 10/718,311

<141> 2003-11-20

<160> 18

<170> PatentIn version 3.4

<210> 1

<211> 32

<212> DNA

<213> artificial sequence

<220>

<223> Primer

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<211> 34

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catcttacta gatctttagt acaacggta cgcc 34

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<211> 495

<212> DNA

<213> Escherichia coli

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cagcagggaa aaacggtaag cgtgacgatg atccgcgaag ggtttgtcga gcagaatgaa 180

atccccgaag aactgcccgt gctgcccggaa gagtctcggt actggttacg tgaaatttg 240

ttatgtgccg atggtaacc gtggctgcc ggtcgtaacc tcgttcgtgt gtcaacgtta 300

agcggggccgg agctggcggtt acaaaaattg ggtaaaaacgc cgttaggacg ctatctgttc 360

acatcatcga cattaacccg ggactttatt gagataggcc gtgatgccgg gctgtggggg 420

cgacgttccc gcctgcgatt aagcgtaaa ccgctgtgc taacagaact gttttaccg 480

gcgtcaccgt tgtac 495

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<213> Escherichia coli

<400> 4

Met Ser His Pro Ala Leu Thr Gln Leu Arg Ala Leu Arg Tyr Cys Lys
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Glu Ile Pro Ala Leu Asp Pro Gln Leu Leu Asp Trp Leu Leu Leu Glu
20 25 30

Asp Ser Met Thr Lys Arg Phe Glu Gln Gln Gly Lys Thr Val Ser Val
35 40 45

Thr Met Ile Arg Glu Gly Phe Val Glu Gln Asn Glu Ile Pro Glu Glu
50 55 60

Leu Pro Leu Leu Pro Lys Glu Ser Arg Tyr Trp Leu Arg Glu Ile Leu
65 70 75 80

Leu Cys Ala Asp Gly Glu Pro Trp Leu Ala Gly Arg Thr Val Val Pro
85 90 95

Val Ser Thr Leu Ser Gly Pro Glu Leu Ala Leu Gln Lys Leu Gly Lys
100 105 110

Thr Pro Leu Gly Arg Tyr Leu Phe Thr Ser Ser Thr Leu Thr Arg Asp
115 120 125

Phe Ile Glu Ile Gly Arg Asp Ala Gly Leu Trp Gly Arg Arg Ser Arg
130 135 140

Leu Arg Leu Ser Gly Lys Pro Leu Leu Leu Thr Glu Leu Phe Leu Pro
145 150 155 160

Ala Ser Pro Leu Tyr

165

<210> 5

<211> 39

<212> DNA

<213> artificial sequence

<220>

<223> Primer

<400> 5

ctactcactt agatctccat ggcttcctct gtcatttct 39

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<211> 32

<212> DNA

<213> artificial sequence

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<223> Primer

<400> 6

catcttactc atatgccaca cctgcatgca gc 32

<210> 7

<211> 684

<212> DNA

<213> artificial sequence

<220>

<223> Chimeric gene encoding chloroplast-targeted CPL fusion protein

<400> 7

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caaaacacctg acatcacccatc cattgcttagc aatggtgaa gagtttagctg catgcagggt 180
tggcatatgt cacaccccgca gtttaacgcaa ctgcgtgcgc tgctgtattt taaagagatc 240
cctgcccctgg atccgcaact gctcgactgg ctgttgctgg aggattccat gacaaaacgt 300
tttgaacagc agggaaaaaac ggtaagcgtg acgatgatcc gctaagggtt tgctgagcag 360
aatgaaatcc ccgaagaact gccgctgctg ccgaaagagt ctcgttactg gttacgtgaa 420
attttgttat gtgccgatgg tgaaccgtgg ctggccggtc gtaccgtcgt tcctgtgtca 480
acgttaagcg ggccggagct ggcttacaa aaattggta aaacgcccgtt aggacgctat 540
ctgttcacat catcgacatt aaccgggac tttattgaga taggcccgtgtccgggctg 600
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<210> 8

<211> 227

<212> PRT

<213> artificial sequence

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<223> Synthetic chloroplast-targeted CPL fusion protein

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Met Ala Ser Ser Val Ile Ser Ser Ala Ala Val Ala Thr Arg Ser Asn

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Val Thr Gln Ala Ser Met Val Ala Pro Phe Thr Gly Leu Lys Ser Ser
20 25 30

Ala Thr Phe Pro Val Thr Lys Lys Gln Asn Leu Asp Ile Thr Ser Ile
35 40 45

Ala Ser Asn Gly Gly Arg Val Ser Cys Met Gln Val Trp His Met Ser
50 55 60

His Pro Ala Leu Thr Gln Leu Arg Ala Leu Arg Tyr Cys Lys Glu Ile
65 70 75 80

Pro Ala Leu Asp Pro Gln Leu Leu Asp Trp Leu Leu Leu Glu Asp Ser
85 90 95

Met Thr Lys Arg Phe Glu Gln Gln Gly Lys Thr Val Ser Val Thr Met
100 105 110

Ile Arg Glu Gly Phe Val Glu Gln Asn Glu Ile Pro Glu Glu Leu Pro
115 120 125

Leu Leu Pro Lys Glu Ser Arg Tyr Trp Leu Arg Glu Ile Leu Leu Cys
130 135 140

Ala Asp Gly Glu Pro Trp Leu Ala Gly Arg Thr Val Val Pro Val Ser
145 150 155 160

Thr Leu Ser Gly Pro Glu Leu Ala Leu Gln Lys Leu Gly Lys Thr Pro
165 170 175

Leu Gly Arg Tyr Leu Phe Thr Ser Ser Thr Leu Thr Arg Asp Phe Ile
180 185 190

Glu Ile Gly Arg Asp Ala Gly Leu Trp Gly Arg Arg Ser Arg Leu Arg
195 200 205

Leu Ser Gly Lys Pro Leu Leu Leu Thr Glu Leu Phe Leu Pro Ala Ser
210 215 220

Pro Leu Tyr
225

<210> 9
<211> 34
<212> DNA
<213> artificial sequence

<220>
<223> Primer

<400> 9
ctactcatt gaagactgca tgcagggttg gcat 34

<210> 10
<211> 34
<212> DNA
<213> artificial sequence

<220>

<223> Primer

<400> 10

catcttactg tcgactttag tacaacggtg acgc 34

<210> 11

<211> 37

<212> DNA

<213> artificial sequence

<220>

<223> Primer

<400> 11

ctactcattt ggccagctct gtcatttctt cagcagc 37

<210> 12

<211> 31

<212> DNA

<213> artificial sequence

<220>

<223> Primer

<400> 12

catcttacta gatctttagt acaacggtga c 31

<210> 13

<211> 33

<212> DNA

<213> artificial sequence

<220>

<223> Primer

<400> 13

cccggggta cctaaagaag gagtgcgtcg aag 33

<210> 14

<211> 46

<212> DNA

<213> artificial sequence

<220>

<223> Primer

<400> 14

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<210> 15

<211> 62

<212> PRT

<213> artificial sequence

<220>

<223> Synthetic chloroplast-targeting sequence

<400> 15

Met Ala Ser Ser Val Ile Ser Ser Ala Ala Val Ala Thr Arg Ser Asn

1 5 10 15

Val Thr Gln Ala Ser Met Val Ala Pro Phe Thr Gly Leu Lys Ser Ser

20 25 30

Ala Thr Phe Pro Val Thr Lys Lys Gln Asn Leu Asp Ile Thr Ser Ile

35 40 45

Ala Ser Asn Gly Gly Arg Val Ser Cys Met Gln Val Trp His

50 55 60

<210> 16

<211> 170

<212> PRT

<213> artificial sequence

<220>

<223> Processed chloroplast-targeted CPL synthetic fusion protein

<400> 16

Met Gln Val Trp His Met Ser His Pro Ala Leu Thr Gln Leu Arg Ala

1 5 10 15

Leu Arg Tyr Cys Lys Glu Ile Pro Ala Leu Asp Pro Gln Leu Leu Asp

20 25 30

Trp Leu Leu Leu Glu Asp Ser Met Thr Lys Arg Phe Glu Gln Gln Gly

35 40 45

Lys Thr Val Ser Val Thr Met Ile Arg Glu Gly Phe Val Glu Gln Asn

50 55 60

Glu Ile Pro Glu Glu Leu Pro Leu Leu Pro Lys Glu Ser Arg Tyr Trp

65 70 75 80

Leu Arg Glu Ile Leu Leu Cys Ala Asp Gly Glu Pro Trp Leu Ala Gly

85 90 95

Arg Thr Val Val Pro Val Ser Thr Leu Ser Gly Pro Glu Leu Ala Leu
100 105 110

Gln Lys Leu Gly Lys Thr Pro Leu Gly Arg Tyr Leu Phe Thr Ser Ser
115 120 125

Thr Leu Thr Arg Asp Phe Ile Glu Ile Gly Arg Asp Ala Gly Leu Trp
130 135 140

Gly Arg Arg Ser Arg Leu Arg Leu Ser Gly Lys Pro Leu Leu Leu Thr
145 150 155 160

Glu Leu Phe Leu Pro Ala Ser Pro Leu Tyr
165 170

<210> 17
<211> 180
<212> PRT
<213> Solanum lycopersicum

<400> 17

Met Ala Ser Ser Val Ile Ser Ser Ala Ala Val Ala Thr Arg Ser Asn
1 5 10 15

Val Thr Gln Ala Ser Met Val Ala Pro Phe Thr Gly Leu Lys Ser Ser
20 25 30

Ala Thr Phe Pro Val Thr Lys Lys Gln Asn Leu Asp Ile Thr Ser Ile
35 40 45

Ala Ser Asn Gly Gly Arg Val Ser Cys Met Gln Val Trp Pro Pro Ile
50 55 60

Asn Met Lys Lys Tyr Glu Thr Leu Ser Tyr Leu Pro Asp Leu Ser Asp
65 70 75 80

Glu Gln Leu Leu Ser Glu Ile Glu Tyr Leu Leu Lys Asn Gly Trp Val
85 90 95

Pro Cys Leu Glu Phe Glu Thr Glu His Gly Phe Val Tyr Arg Glu Asn
100 105 110

Asn Lys Ser Pro Gly Tyr Tyr Asp Gly Ser Thr Gly Pro Cys Gly Ser
115 120 125

Cys Leu Cys Leu Gly Ala Leu Met Gln Pro Lys Cys Trp Leu Arg Phe
130 135 140

Lys Arg Leu Lys Arg His Thr His Lys His Gly Ser Glu Ser Leu Asp
145 150 155 160

Ser Thr Met Cys Val Lys Cys Ser Val Ser Val Ser Leu Pro Thr Ser
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Gln Lys Ala Thr
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<211> 231

<212> PRT

<213> Artificial sequence

<220>

<223> TP-UbiC synthetic fusion protein

<400> 18

Met Ala Ser Ser Val Ile Ser Ser Ala Ala Val Ala Thr Arg Ser Asn

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Val Thr Gln Ala Ser Met Val Ala Pro Phe Thr Gly Leu Lys Ser Ser

20 25 30

Ala Thr Phe Pro Val Thr Lys Lys Gln Asn Leu Asp Ile Thr Ser Ile

35 40 45

Ala Ser Asn Gly Gly Arg Val Ser Cys Ala Val Pro Cys Asn Gly Glu

50 55 60

Phe Gly Met Ser His Pro Ala Leu Thr Gln Leu Arg Ala Leu Arg Tyr

65 70 75 80

Cys Lys Glu Ile Pro Ala Leu Asp Pro Gln Leu Leu Asp Trp Leu Leu

85 90 95

Leu Glu Asp Ser Met Thr Lys Arg Phe Glu Gln Gln Gly Lys Thr Val

100 105 110

Ser Val Thr Met Ile Arg Glu Gly Phe Val Glu Gln Asn Glu Ile Pro

115 120 125

Glu Glu Leu Pro Leu Leu Pro Lys Glu Ser Arg Tyr Trp Leu Arg Glu
130 135 140

Ile Leu Leu Cys Ala Asp Gly Glu Pro Trp Leu Ala Gly Arg Thr Val
145 150 155 160

Val Pro Val Ser Thr Leu Ser Gly Pro Glu Leu Ala Leu Gln Lys Leu
165 170 175

Gly Lys Thr Pro Leu Gly Arg Tyr Leu Phe Thr Ser Ser Thr Leu Thr
180 185 190

Arg Asp Phe Ile Glu Ile Gly Arg Asp Ala Gly Leu Trp Gly Arg Arg
195 200 205

Ser Arg Leu Arg Leu Ser Gly Lys Pro Leu Leu Leu Thr Glu Leu Phe
210 215 220

Leu Pro Ala Ser Pro Leu Tyr
225 230